

SERVICE INSTRUCTION MANUAL

KITCHENAID ELECTRIC HOUSEWARES



K5-A FOOD PREPARER



K-45 FOOD PREPARER

INTRODUCTION

The models K-45 and K5A KitchenAid mixers are well designed and carefully built units. Normally they will give continual use year after year without requiring service attention.

Careful records have been maintained over a period of years to determine any troubles that might possibly develop. An effort has been made in preparation of this manual to cover all possible trouble.

Parts and authorized service are available through your nearest Hobart outlet. Consult the yellow pages of the local telephone directory under the heading "Restaurant Equipment."

Why only one beater? Planetary Action

Long ago, KitchenAid engineers discovered that the secret to really efficient mixing was to travel a single beater clockwise around the bowl while rotating it counterclockwise. Appropriately, we call it planetary action. The same action used in commercial bakery mixers. It assures you faster, more thorough blending of ingredients, perfect results with fast cleanup, too. And only KitchenAid has it.

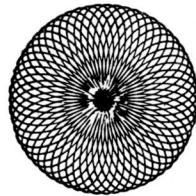


Diagram above shows the complete mixing coverage of the bowl made by the path of the beater as it makes a complete rotation cycle. This is how KitchenAid achieves the most uniform mixing action without turning the bowl.

KITCHENAID MODELS K-45 AND K5A FOOD PREPARERS

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GENERAL INFORMATION

NORMAL PERFORMANCE

The KitchenAid mixer is powered with a universal motor which will operate on alternating current only. The voltage of the power supply should be within 5 percent either way of the voltage stamped on the trim band and name plate.

A mixer in good running order will start turning slowly when the switch lever is moved from the "OFF" to the No. 1 position. As it is moved to successively higher positions, the speed of the beater increases until the No. 10 or high speed position is reached. At No. 1 position the planetary should turn at approximately 60 RPM, at the No. 10 position it should turn at approximately 275 RPM. The mixer will run quietly in the lower speed range, however, some noise can be expected on the higher speed settings due to the hum of gears and the motor.

When the mixer is first turned to the No. 1 position, there may be a slight clattering, irregular noise. This noise will disappear as the lubrication in the gear case warms up.

The switch lever should move freely with the "feel" of the definite positions for speed Nos. 1, 2, 4, 6, 8 and 10. Speed Nos. 3, 5, 7 and 9 do not have definite notches.

POWER

A normal mixer will have full power on all speed settings. To check for full power hold the planetary with one hand and move the switch lever on and off with the other hand. At the No. 1 position it should not be possible to stall the planetary except by a very great effort, nor should the planetary slow down noticeably when the retarding pressure is applied.

HEATING

A normal mixer will heat up somewhat if run continually on high speed for 15 minutes or more. However, the extent of heating will not be very noticeable.

On No. 1 position the mixer will heat up considerably if run continuously for some length of time. This is a very abnormal running condition, as none of the recipes specify running on low speed for more than a few minutes at a time. Operation at the No. 1 position is also the worst possible condition as far as heating is concerned because

the cooling effect of the ventilating fan on the armature is least on low speed and the resistor in the speed control mechanism is called upon to absorb most of the electrical energy.

A Mixer might heat up to the point where it is uncomfortable to the touch if it is allowed to run at low speeds for a considerable length of time. If the mixer is new, it may even smoke slightly if there should be oil on the resistor. Smoking will stop as soon as the oil evaporates.

Heating need be no cause for alarm, as it will never rise to the point where it will cause any damage. Briefly, a mixer used under normal conditions will not show any tendency to heat excessively. Even under quite abnormal conditions it will not heat to the point of damage.

SPEED CONTROL

The speed control of the mixer is attained through the use of an electrical governor assembly mounted at the rear of the armature shaft and bearing against the control plate assembly. The electrical circuit is made and broken by the action of the fly ball governor revolving against the control plate. When the switch lever is moved to an ON position, the position of the control plate with respect to the governor is changed by the action of the switch control mechanism which is built into the bottom of the gear case and motor housing, thereby changing the speed of the motor. Thus, when the control plate is set close to the governor, a relatively low speed of the motor causes the governor to make or break the electrical circuit through the control plate contact points. When the control plate is set farther away, a greater motor speed is required before the governor starts breaking the circuit.

The action of the governor is such that the speed of the motor will remain constant for a given setting of the control plate regardless of the load imposed on the mixer.

The speed control mechanism contains a resistor which is connected in parallel with the control plate contact points. By this means the electrical circuit is not completely broken when the contact points are opened through the action of the governor. The circuit is then shunted through the resistor. A capacitor is connected across the control plate breaker points to suppress sparking. During normal operation the speed control mechanism will show a faint white spark at the contact points. A heavy blue spark indicates either a defective capacitor or an open resistor.

BEATER

The beater should fit freely on the beater shaft located in the planetary. Power is transmitted from the motor to the center gear and bevel gear assembly by means of the worm gear. The center gear and bevel gear assembly engages the beater pinion, located in the planetary, to turn the beater shaft. The attachment hub bevel gear also meshes with the center gear and bevel gear assembly to transmit power when various attachments are being used.

LUBRICATION

Under normal service conditions the mixer will not require lubrication for many years. The gear case is packed with an ample supply of special grease which lubricates all the gears and shafts. The rear motor bearing and the beater shaft are the oilless type. For additional security the beater shaft bearing is fed oil by a saturated wick

reservoir and the rear motor bearing by a felt washer. The front motor bearing is a ball bearing.

When a mixer is subjected to abnormally severe usage, it is advisable to check the planetary and its internal gear for the proper amount of lubrication. To remove the planetary first pry off the drip cup. Remove the groov-pin from the end of the center shaft and pry off the complete planetary, using two screwdrivers, one on each side.

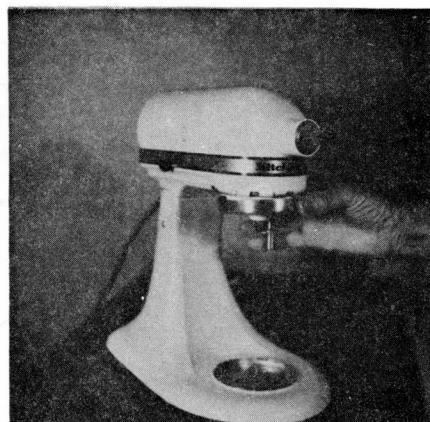
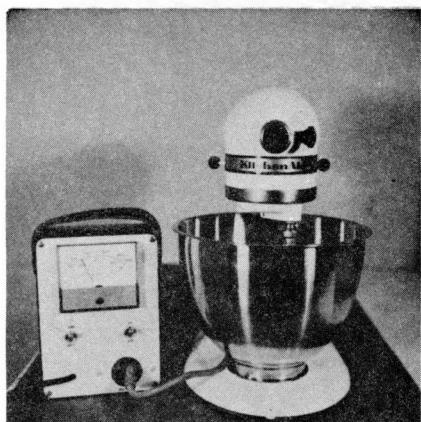
Check that the planetary beater shaft is free-running. Place a few drops of light or medium weight oil on the beater shaft and wipe off the excess. Wipe about a teaspoonful of medium weight grease on the inside of the planetary internal gear teeth. Make certain that the grease fills the teeth with a little excess all around the top edge. Reassemble the planetary to the mixer as previously removed.

MODELS K45 AND K5-A KITCHENAID MIXERS

SECTION 1 DISASSEMBLY OF GEAR CASE AND PLANETARY

A. The Models K45 and K5-A KitchenAid mixers have the same motors and control parts and the gears in the gear case are alike with one exception. Planetary parts are all the same. Gearing and motor instructions are for both machines in one section and any differences will be pointed out. The Model K5-A has an entirely different bowl and bowl lift. On the Model K5-A the bowl is raised and lowered and on the Model K45 the entire head is lifted. The bowl, column, base and bowl lift of the K5-A are covered separately in section 7.

B. Before repairs are attempted on the Models K45 and K5-A KitchenAid mixers, a watt test should be made. To make the test, plug the wattmeter into the proper voltage. Plug the cord from the mixer into the wattmeter. Turn on the current and run the mixer. If the dial shows 105 to 135 watts, going from 1st to high speed, the mixer is in good condition. If the reading is 175 to 400 watts, there is trouble. To find the trouble, check each part of the motor as it is removed. Use an ohmmeter to check individual parts.



C. To remove the planetary, remove the drip cup (34, Fig. 1). The drip cup fits the gear case bottom cover (21) tightly and must be started off the cover by tapping it. Use a screwdriver on the upper edge of drip cup and tap screwdriver gently to remove the drip cup.

D. Remove the groove pin (19) that holds the planetary (28) to the vertical center shaft (13). With pin out, the planetary can be pried off the shaft. Pad the base with cloths and with two screwdrivers, pry the planetary down and off the shaft.



E. Remove the #6-32 x 3/8" oval head screw (62) and take off the end cover (61). Unscrew and remove the two #6-32 x 3/16" binding head screws (63) that hold the trim band (5) to the gear case and motor housing (1). With screws out, remove the trim band.

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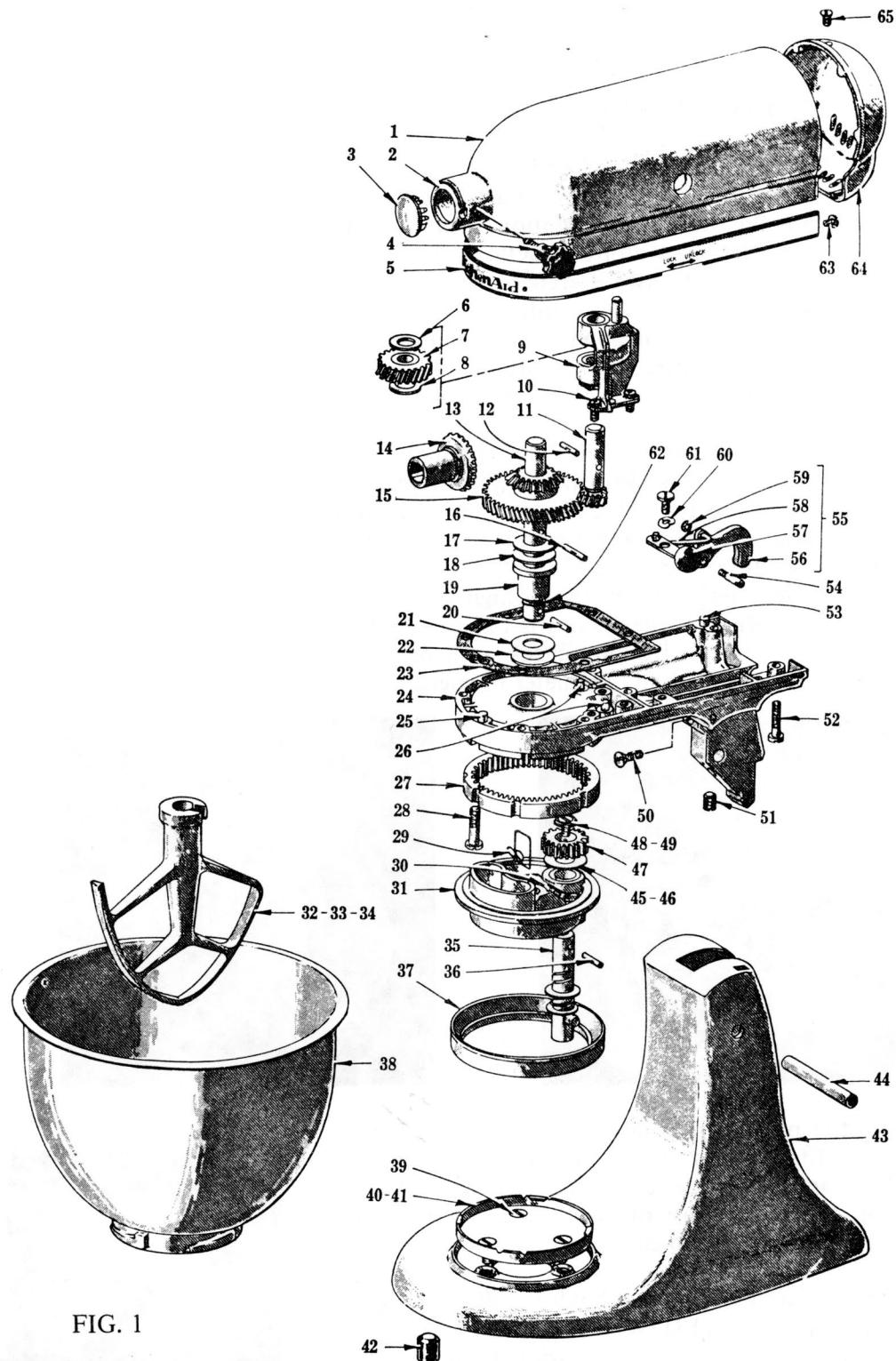
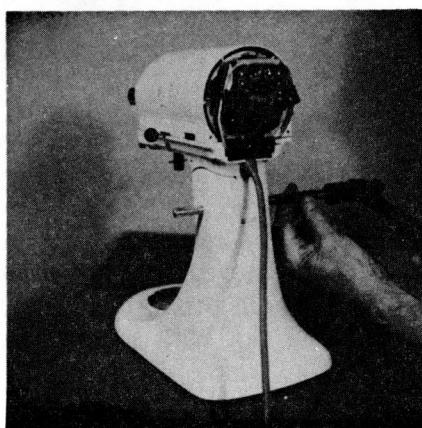
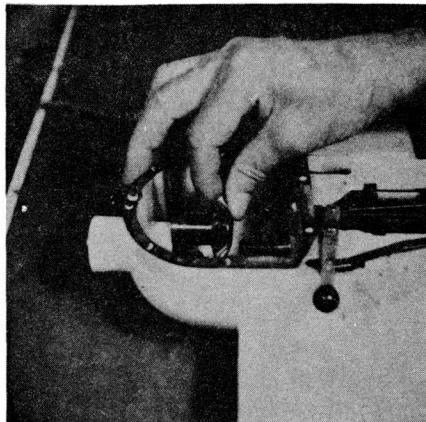
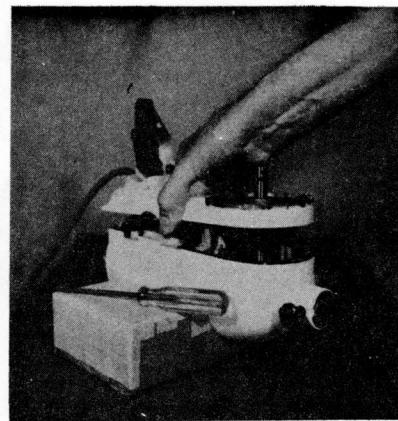


FIG. 1



F. To remove the gearing, the gear case and motor housing (1) and the gear case bottom cover (24) must be removed from the pedestal. With a screwdriver loosen the set screw (51) that locks the hinge pin (44). With a drift punch and hammer, drive out the hinge pin and lift the head off the pedestal. To save the paint, lay the gear case and motor housing in a padded cradle or lay it on cloth pad.

G. To remove the bottom cover (24) from the gear case and motor housing unscrew and remove the five special screws (28). These screws hold the internal gear (27) to the gear case. Unscrew and remove the four #10-24 x 1" fillister head screws (52) from bottom cover. With a screwdriver on each side, pry off the cover. The transmission gears will come out with the cover and the cord and plug will remain with the gear case and motor housing.



H. Remove the attachment hub bevel gear (14). This gear can be removed by simply pulling it out of the attachment hub. It will clear the worm on the motor shaft. Due to the slow speed of this gear there should be no trouble with the shaft galling and it should be easy to remove.

I. Clean out the gear case. Remove as much of the grease as possible. The gear case ~~will~~ be thoroughly cleaned when the motor has been removed.

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SECTION 2 DISASSEMBLY OF MOTOR AND CONTROL UNIT

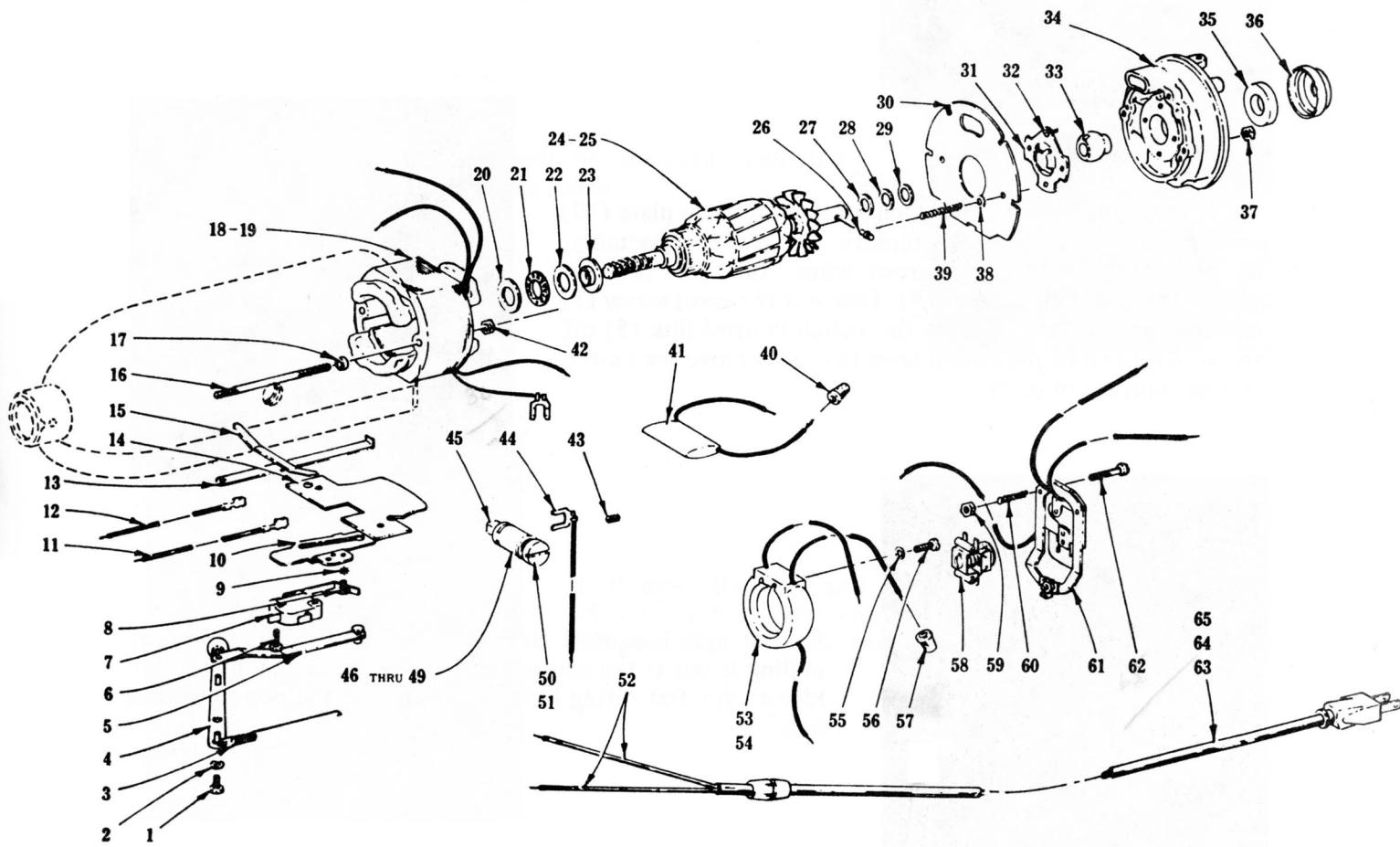
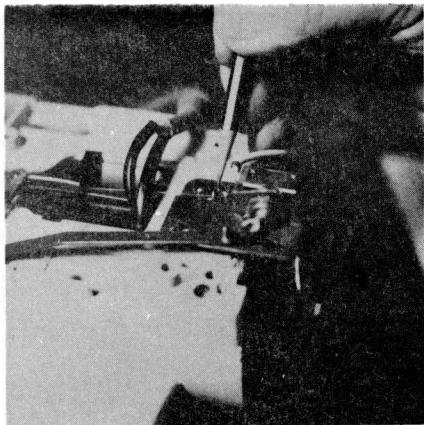
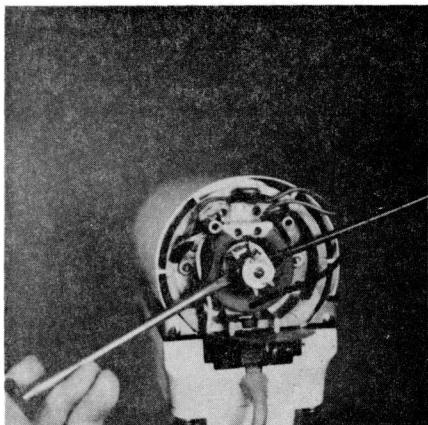


FIG. 2



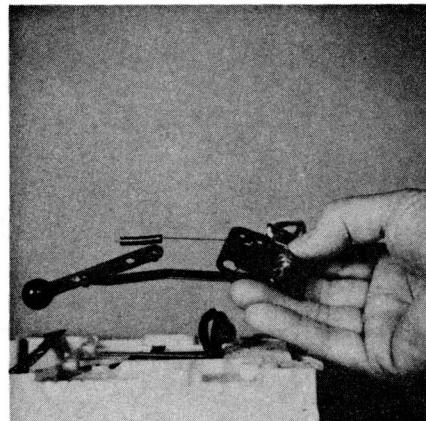
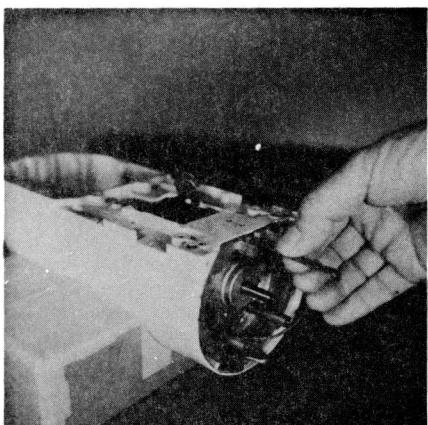
A. Start disassembly of the control unit by removing the gear case cover baffle (14, Fig. 2). Unscrew the three wire connectors (57) and separate all the wires. Unlock the two lock nuts (59) and unscrew the two adjusting screws (62). Unhook the control plate spring (3) and let it rest on the switch bracket and cam plate (10). The control plate can now be removed along with the capacitor (41).

B. The resistor (53) is assembled on the motor at the top. The red wires are on the right side and the yellow wires on the left. To remove the resistor, take out the two screws (56), and remove the resistor. The washers (55) will remain in the resistor.



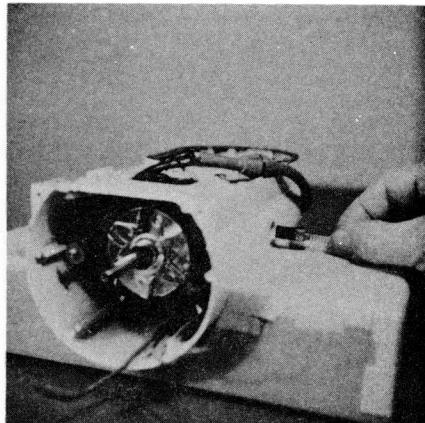
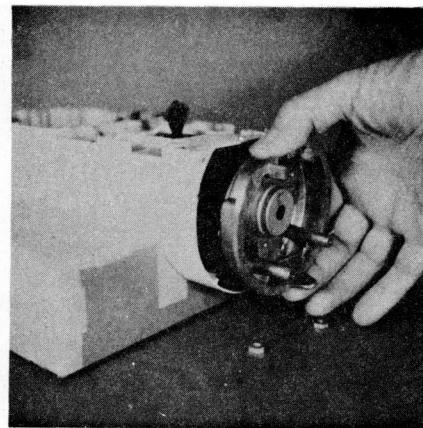
C. With two screwdrivers, pry off the governor assembly (58). Remove the governor drive stud (26) and lay it away so it will not be lost.

D. Remove the switch (7), switch bracket and cam plate (10) and switch lever (4). To remove the switch assembly, disconnect the yellow and green wires. Take out the two screws (8) and lock washers (9). Take out the pivot screw (1) and tension washer (2). Slide the switch control link (5) off the stud on end of the switch lever (4) and remove the switch and its component parts.

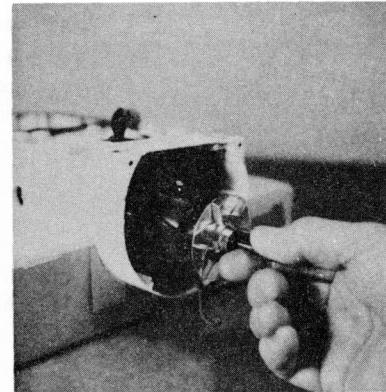


E. The speed control link (13) can now be removed by pulling it out at the rear of the housing. Before pulling it out, remove the flat spring (15), then pull out the switch control link.

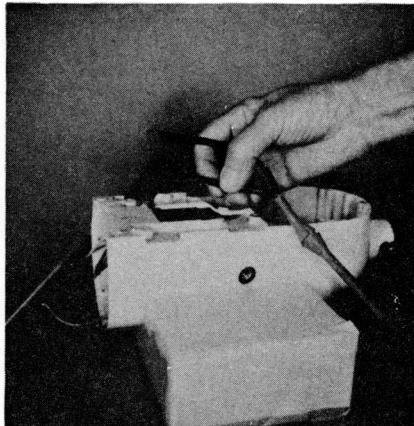
F. Unscrew and remove the two #10-24 nuts (37), then remove the bearing bracket (34) and the baffle plate (30). Also remove the springs (39) and washers (38). Keep these springs and washers with the baffle plate and bearing bracket.



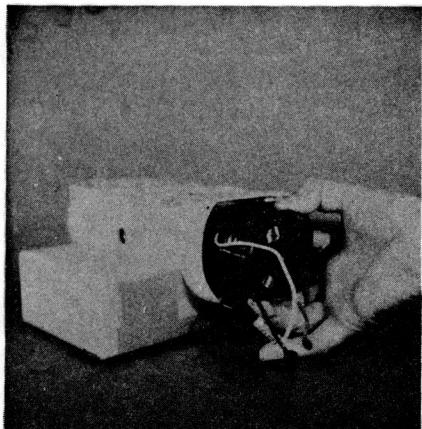
G. Unscrew the two brush holder screw caps (50) and remove the brushes and springs (45). Viewing from the rear, mark the brushes right and left and also the top of the brush, just as it was removed from the motor.



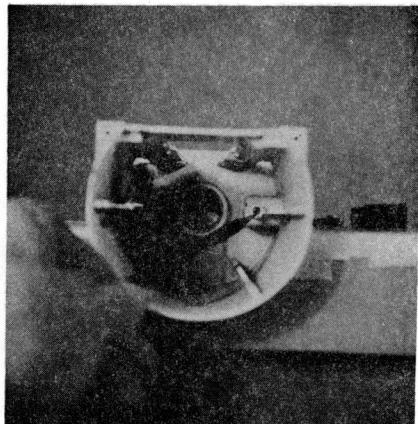
H. The armature (14) can now be removed. Pull the armature straight back through the stator.



I. Remove the cord and plug. Unscrew the wire connector (57) from the white cord lead and the white stator lead. Remove the connector from black cord lead and black stator lead.



J. With long nose pliers, pull off the wire clip from the right hand brush holder. Remove the two #10-24 nuts (42) and pull out the stator (48). To pull the stator out, reach into motor housing and grasp the stator at rear of housing and pull forward.

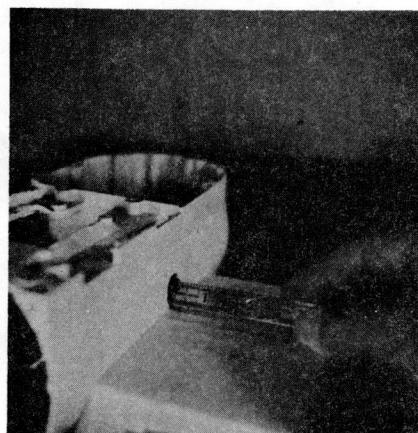


K. To remove the brush holders (46), it will be necessary to unscrew and remove the two stator screws (16) and spacers (17). Under the stator screws are the #10-24 x 1/4" cup point set screws (43). With a small screwdriver, unscrew the set screws (43) a few turns and pull out the brush holders.

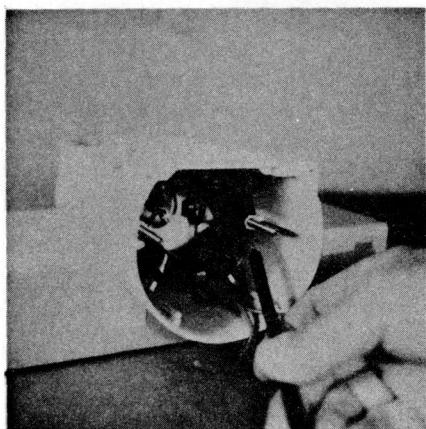
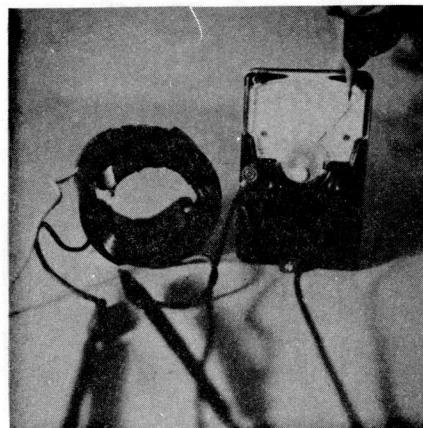
L. Wash out the gear case with a good solvent and wipe it dry with a clean dry cloth. Clean out the motor housing with a cloth dampened with solvent and wipe it dry with a clean cloth.

SECTION 3 REPAIRS TO MOTOR AND CONTROL UNIT

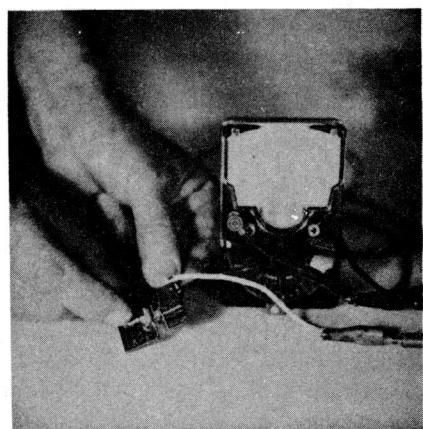
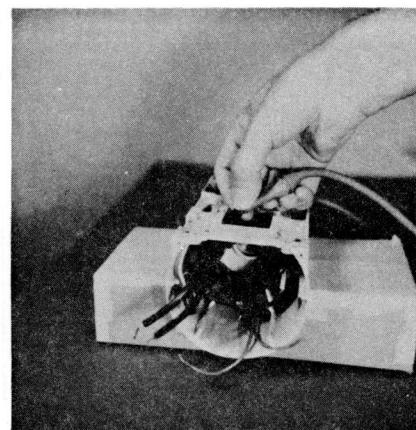
A. Clean the brush holders (46, Fig. 2) with solvent and wipe them dry with a clean dry cloth. Install brush holders in housing so that brushes will ride the commutator squarely. Push brush holders in 5/32" from outside of housing then lock in place with the #10-24 cup point set screws (43). Clip the green wire to the left hand holder.



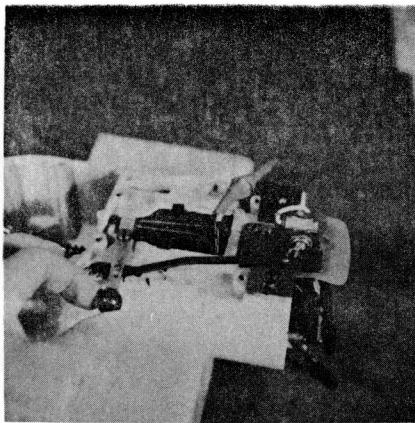
B. Test the stator (18) with an ohmmeter. Set the ohmmeter on the 1X scale and set it at "O". In upper coil, connect one of the ohmmeter leads to the red wire and the other lead to the black wire from the upper coil. If the ohmmeter shows a low resistance reading the coil is good. Check the other coil the same way. If the needle on ohmmeter deflected to zero or if there was no deflection, the coil is bad and stator must be replaced.



C. Place the two spacers (17) on the stator screws (16). With red wire of stator to the rear start the stator on the two screws (16) and onto the ribs of the housing. Push it back as far as it will go, then place a #10-32 nut (42) on each screw (16). Tighten both nuts.



E. Check the switch (7) with an ohmmeter. Connect the ohmmeter leads to the green and yellow switch leads. Set ohmmeter on the 1X range. Snap switch on and off several times for a good test. If the needle deflects each time the switch is turned on, it is in good condition and can still be used.



F. Place the speed control connecting link (13) in position with the bent end up toward top of housing. Lay the switch bracket and cam plate (10) on the housing and screw in the two screws (8) with lock washers (9). Put the control link (13) on the stud in end of switch lever (4). Place the switch control link on stud near knob of switch lever. Place spring (15) under the control link (13) so that ends of spring are up and rest against the gear case bosses. This spring will provide pressure to hold the control link (13) on the switch lever (4).

G. Check the armature on a growler or take the armature to an electric motor repair shop and let them test it. If it is not in good condition, replace it with a new one. If the old armature is equipped with a thrust ball bearing and it is still good, pull it off the shaft with a gear puller. Slide the washer on the commutator end of the new armature. Place the ball bearing on the shaft with open side toward end of shaft. Seat it with a sleeve and hammer. Place other washer on open side of bearing. If the old armature is equipped with a thrust sleeve bearing, the complete bearing assembly (20, 21, 22, 23) should be replaced if necessary.

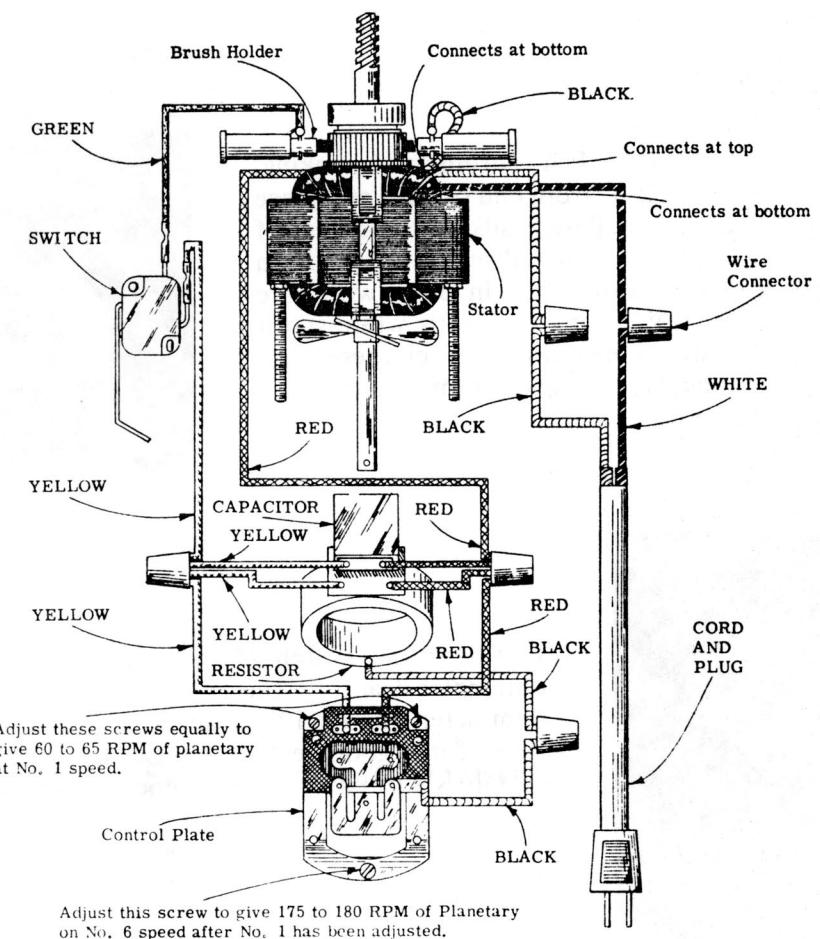
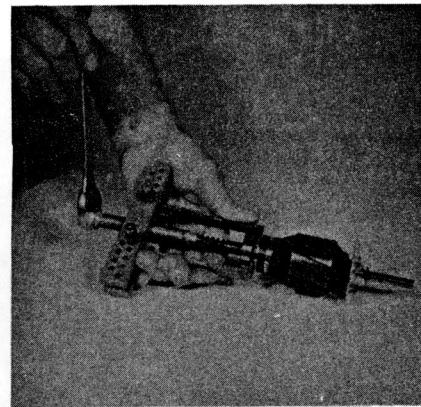
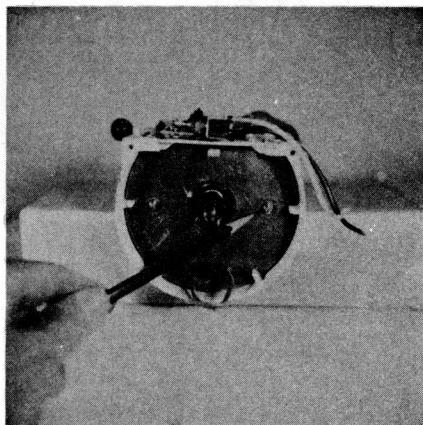
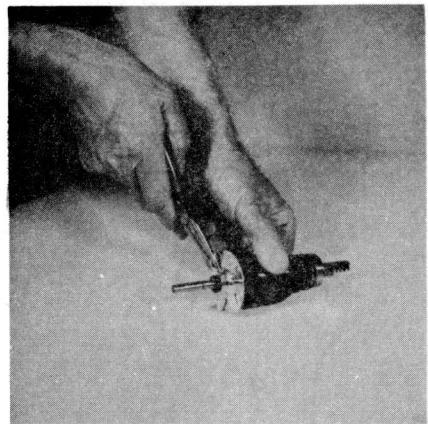


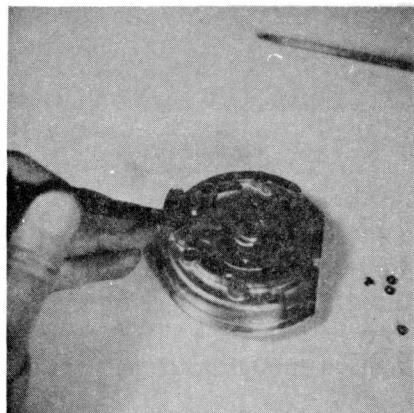
FIG. 3

H. Check the ventilating fan. Straighten the blades if they are bent. Move the washers (27), (28), (29) from the old armature to the fan end of the new one. Oil the worm and shaft and install the armature in the housing.

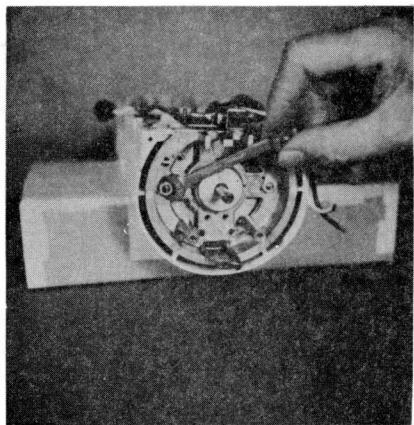


I. Place the springs (39) on the stator screws (16). Place the washers (38) on the screw (16) next to the springs. Place the baffle plate (30) on the studs and push it back on the ribs of the housing.

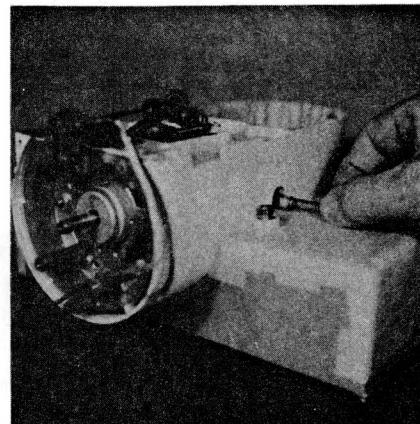
J. Check the bearing (33, Fig. 2) in the bearing bracket (34). To replace the bearing, remove the four #4-40 x 1/8" round head screws (32) and lift off the bearing retainer (31). Take out the old bearing. Place new bearing in cavity with square notch toward the top of the bracket. Place the retainer (31) on the bearing so that the tongue fits into the square notch, then screw in the four screws (32). Soak the felt washer (35) in bearing cap (36) with oil.



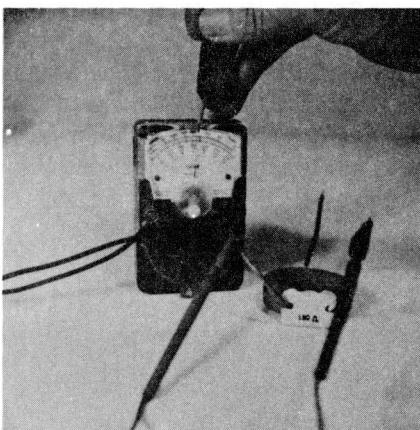
K. Install the bearing bracket (34). Run the red and green leads through the tunnel at top of bracket. Start bracket onto the two stator screws (16). Push the bracket back until it is stopped by the speed control link (13). Push the link down to clear the bracket, then push it back until stator screws are through the bracket. Start the two nuts (37) on the stator screws and turn them on until bearing bracket is seated.



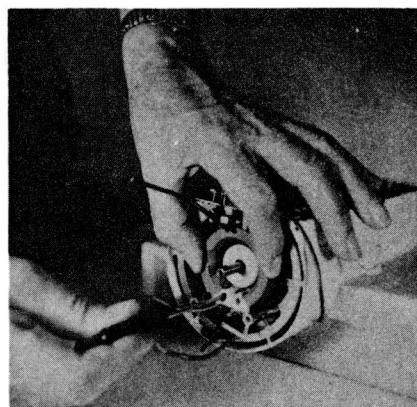
L. Check the armature for end play. With the thrust bearing assembly seated properly and proper amount of spacing washers at the rear, there should be only a perceptible amount of end play to assure free operation of the armature. If there is too much end play, remove it by adding a thin washer, such as (29). To do this, remove the bearing bracket (34) and add the washer to the armature shaft, then return the bearing bracket.



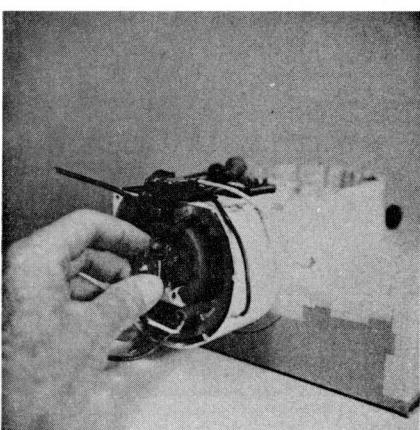
M. If the old brushes are more than 5/16" long, assemble them in the brush holders. From the back of the unit put brush marked "right" in right side brush holder, be sure the side marked "up" is at the top. Push brush in and lock it in place with a brush holder screw cap (50). Place left hand brush in the mixer in the same way.



N. Check the resistor (53). Test it with an ohmmeter. Set the ohmmeter on the 1X range and adjust it to zero. Connect the ohmmeter leads to the red and yellow resistor leads. If resistor is good, there will be a reading of 180 ohms. Disconnect one ohmmeter lead and connect it to the upper black lead of the resistor. If the resistor is good there will be a reading of 90 ohms. If needle does not deflect the resistor is defective and must be replaced.



O. To replace the resistor. Place the washers (55) in screw holes in resistor. Place the two screws (56) in screw holes. Hold resistor in place on the bearing bracket and screw in the two screws (56). These screws must be tight but do not tighten enough to crack the porcelain.

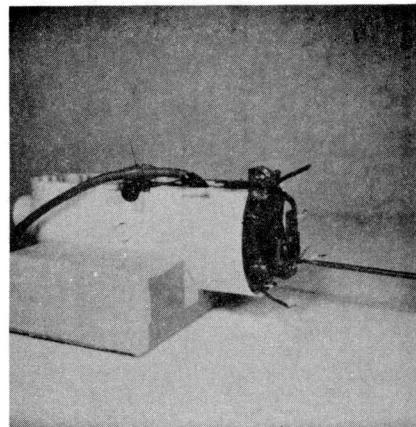
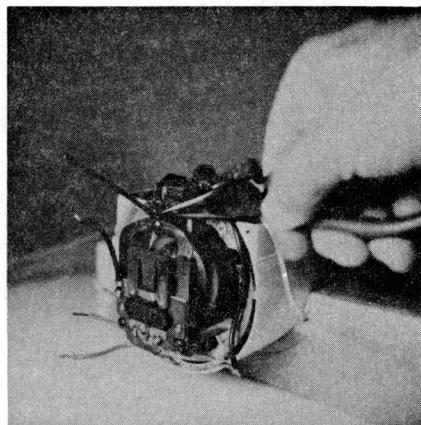


P. If the spring in the governor is rusty, replace the governor assembly (58). Place the governor drive stud (26) in the armature shaft. With drive stud at top of shaft, place the governor on the shaft with the keyway up. Push the governor onto the shaft as far as it will go.

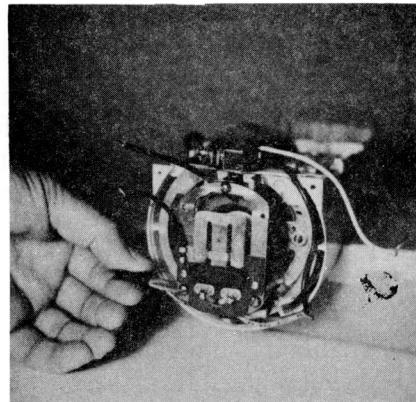
CAUTION: Do not drive against the ball as this will cause damage.

Q. Put a new capacitor (41) in the unit. Lay it over the resistor and back as far as it will go. Be sure the red wire is to the right, viewing from back of mixer.

R. Place a new control plate (61, Fig. 2) on the bearing bracket (34) with adjusting screws (62) at the top. Turn in the screws until about 3/8" of the screw remains. Have both screws turned in evenly so the other end of the control plate rests squarely on the extensions of the bearing bracket.



S. With long nose pliers, hook the control plate spring to the hook on the bottom part of the control plate.

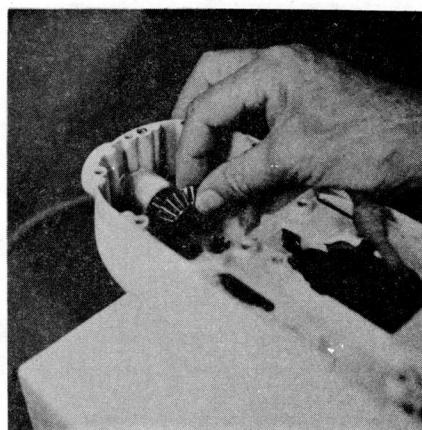


T. Lay the four red wires together, side by side and turn on a wire connector (57). Lay the yellow wires together and also connect with connector (57). Connect the two black wires, one from resistor and the other from the control plate, and lock them in place with connector (40). Use a connector (40) to connect the two green wires.

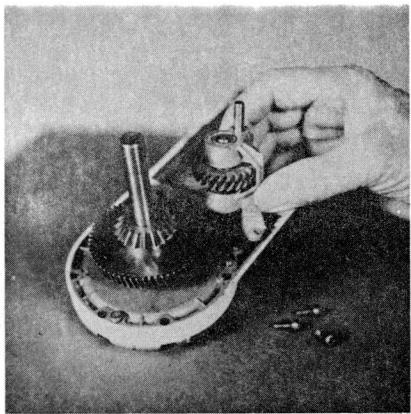
NOTE: Leave the control unit. It is now ready for timing but a better job can be done when mixer is completely assembled.

SECTION 4 REPAIRS TO GEAR CASE AND PLANETARY

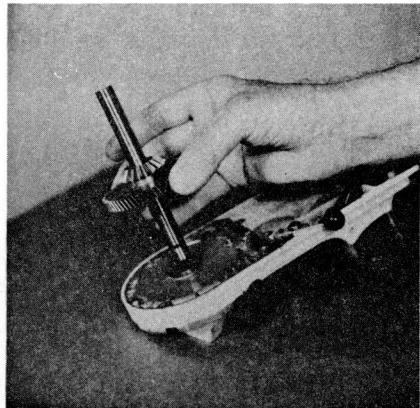
A. Examine the brass bearings in the attachment hub and the roof of the gear case. These bearings are cast in the housing. If they are worn badly, the entire housing must be replaced. However, shafts turn slowly in these bearings and the bearings have a long life.



B. Examine the attachment hub (23 tooth) bevel gear (14, Fig. 1). If it shows wear in the teeth, it should be replaced. To replace the bevel gear, coat the shaft with a film of good oil. Push it into the attachment hub bearing from inside the gear case. It does not have a washer so push it in as far as it will go.

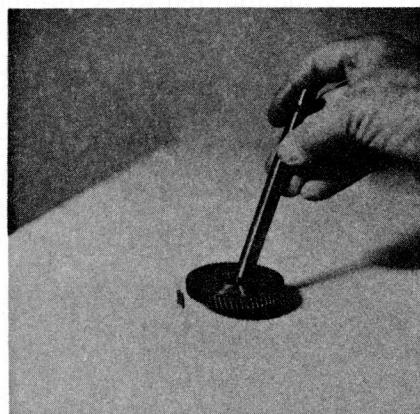
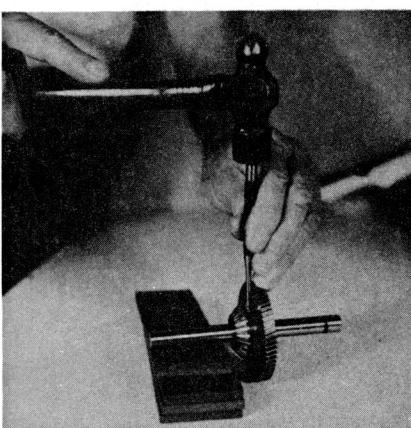


C. With a Phillip screwdriver remove the three #10-24 x 7/16" Phillips fillister head screws and lock washer assemblies (10) and lift out the worm gear bracket and bearing and pin assembly (9).



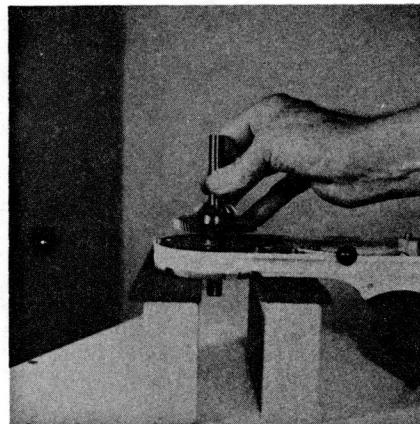
D. With a twisting action, remove the center gear (62T), bevel gear (19T) (15) and vertical center shaft (13) as an assembly. It will not be necessary to remove the "O" ring (59), especially if it is wet with oil and a twisting action used.

E. Check the lower center bearing for wear. Also check the shaft (13) where it rides in the bearing. This is an oilless bearing and should be in good condition. If it is worn, the gear case bottom cover will have to be replaced since the bearing is an integral part.



F. If the attachment hub bevel gear (14) was replaced, then the bevel gear on the center gear and bevel gear assembly (15) must also be replaced. To replace this assembly, drive out the groove pin (16) and pull the gear assembly off the shaft (13).

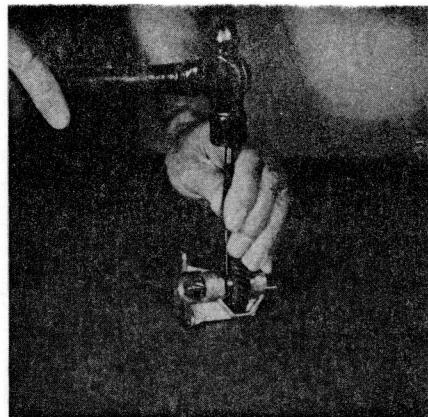
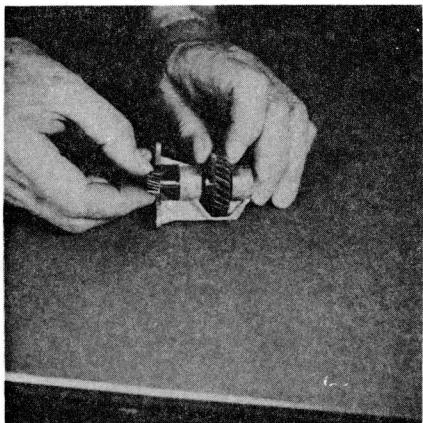
G. Place a new gear assembly (15) on the shaft with the bevel pinion (19T) facing the top of the shaft. Place the groove pin (16) in bevel gear (with holes lined up) and drive it in flush on one side. Place the same washer (17) or (18) on shaft next to the center gear (62T).



H. Oil the shaft and the "O" ring (59). Start the "O" ring end of the shaft down through the lower center bearing and push it down with a twisting action so "O" ring will not be damaged. Push it down until the washer (17) or (18) rests on the bearing (19).

I. Check the (23T) worm gear (7) and the shaft and (11T) pinion (11). To replace these two gears, drive out the groove pin (12). Make a note of positions of fiber washers (6) and (8). They will be installed the same way with new gears. From the top of the worm gear bracket (9), drive out the shaft and pinion (11).

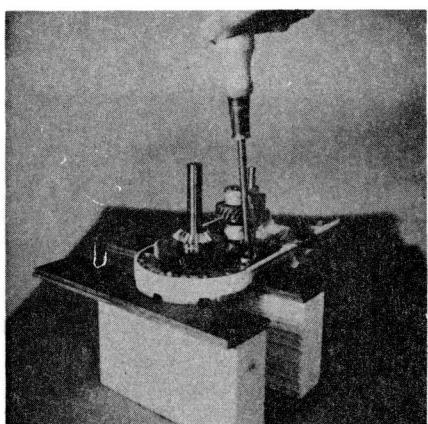
NOTE: The shaft and pinion (11) has 11 teeth on the K45 mixer. This part on the Model K5-A has 10 teeth.



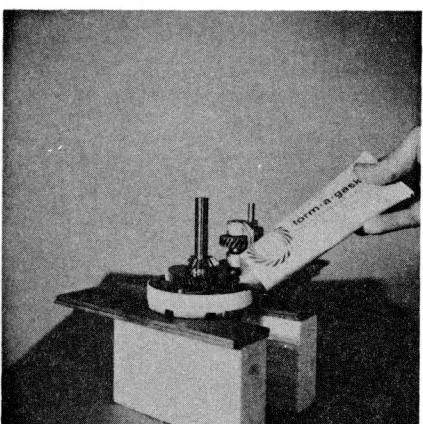
J. Start a new (11T) shaft and pinion (11) from bottom of bracket. Before the shaft emerges from lower bearing, place the washer (8) on bearing and start shaft into the washer. Hold a new worm gear (7) next to washer and push shaft into gear. Before shaft emerges from gear, place washer (6) in place and push shaft through washer and into the upper bearing. Line up the pin holes and drive in the pin (12).

K. Place the worm gear assembly and bearing bracket on the gear case bottom cover (21) so that the two dowels will fit into the base of the bearing bracket. Place the three screw and lock washer assemblies (10) in the holes and screw them into the bottom cover. Be sure these screws are tight.

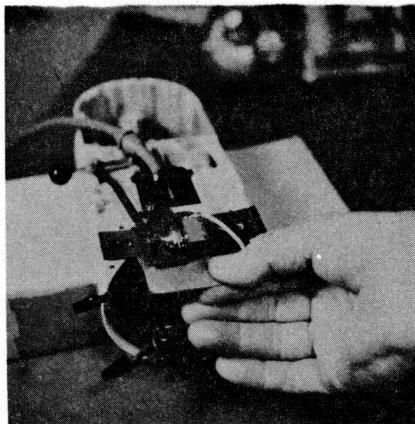
L. Check the latch, link and lever assembly (52). There should be no wear or trouble with this assembly.



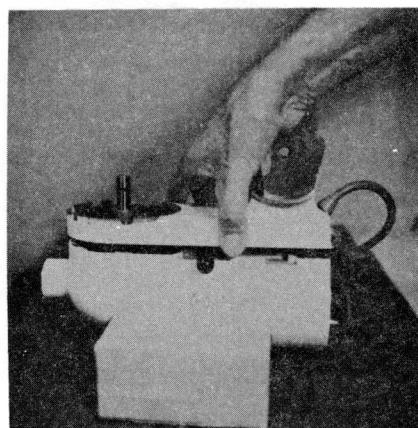
M. Use Shell Darina No. 2 lubricant when filling the gear case. This is available through your nearest authorized Hobart outlet. Try to keep the bearing in roof of gear case open, it will help when assembling the bottom cover and the gear.



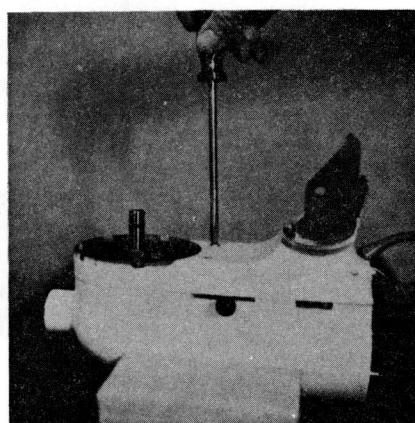
N. Clean the gasket surface of the gear case. Put a thin coat of Permatex #2 on the surface. Put another coat on the gasket surface of the bottom cover. Place the gasket (20) on the bottom cover, over the dowel and press it down so it will stay in position.



O. Place the gear case cover baffle (14, Fig. 2) in position under switch (7) at switch end of the motor housing. Put a small dab of grease in the baffle to hold it in place.



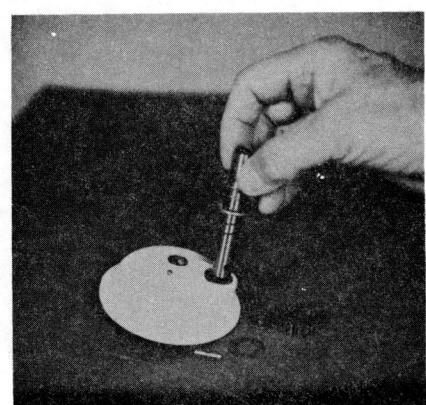
P. Hold the bottom cover (21, Fig. 1) in position over the gear case and motor housing (1) and start joining the two together. Start the shaft (13) into the upper bearing and slowly push the parts together. As soon as parts start to join, place the cord relief (63, Fig. 2) in the slot in the bottom cover, then push the cover and housing together.



Q. With bottom cover (21) and gear case and motor housing together, screw in the four #10-24 x 1" fillister head screws (50) evenly and tightly. Then place the internal gear (24) in place at front of the bottom cover. Line up the notches in the internal gear with the five screw holes in the bottom cover and turn in the five special screws (25). Turn then in evenly and tightly.

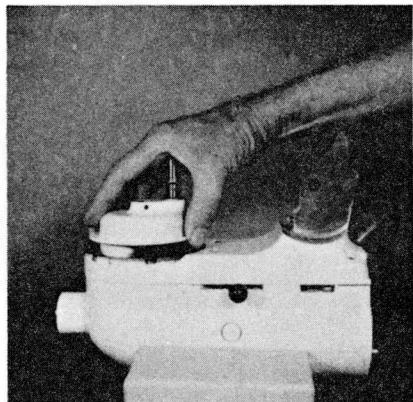
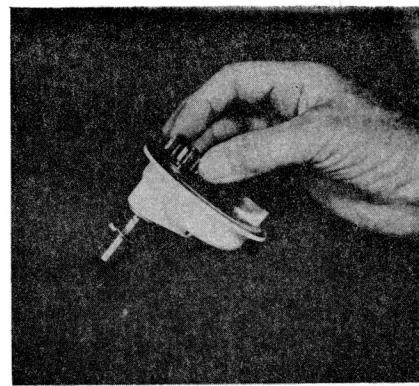
R. Fill the teeth of the internal gear (24) with Shell Darina No. 2 lubricant. Use enough grease so that it will spill over at the top of the gear.

S. Check the condition of the planetary. If there is any play in the agitator shaft (22) and the bearing (not shown), replace the planetary and the shaft. The bearing is an integral part of the planetary. Lift off the pinion (47). Take out the pin (33) and remove the washer (43) or (44). Pull out the agitator shaft.



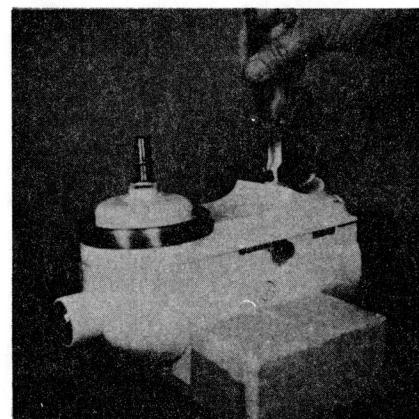
T. The agitator shaft (32) is complete as an assembly. Oil the shaft and push it up into the bearing as far as it will go. Place the washer (43) or (44) on shaft. Place the pin (33) through the shaft. Set the pinion gear (45) on shaft and straddle the pin (33). Place retaining washer (47) on pinion and screw the assembly to the shaft with the #10-32 x 5/16" flat head screw (46).

U. Be sure the planetary has a good supply of grease and that the wicking (27) and the clip (26) are in good condition. Use Shell Darina No. 2 lubricant.

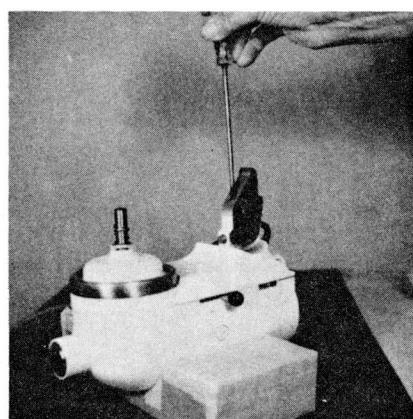


V. Place the washers (17) on the vertical shaft (13). Place the planetary on the shaft and push it up to the washers. Line up the holes in planetary and shaft and drive in the groove pin (19). Place the drip cup (34) on the gear case. Use care so "O" ring will not be damaged.

W. Check the adjusting screw (48). This screw is slotted and has a nylon insert. As it is screwed in, the threads are cut in the nylon and hold the screw tight. Replace this screw if it is loose in the threads.



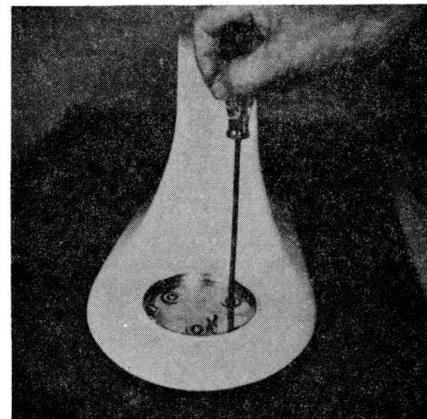
SECTION 5 REPAIRS TO K45 PEDESTAL



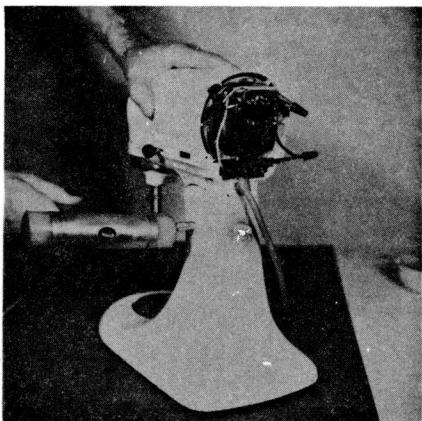
A. Check the hinge pin (42, Fig. 1). If it is galled from failure to loosen the set screw (49), replace it. Loosen the set screw so that it will clear the hinge pin. Place the new hinge pin in the pedestal (41) but do not drive it in.



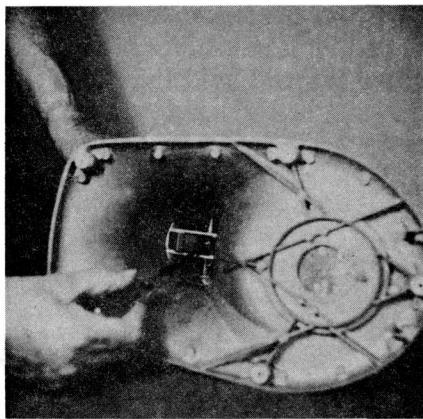
B. Check the rubber feet (40). If they are worn or softened from grease, replace them. Twist the old feet out. Clean the holes with solvent and dry them with clean cloth. Oil or grease the part of the foot that will go into the hole and twist the new feet in. Be sure all feet are in the same amount.



C. If the bowl screw cap (40) has worn out, replace it. To remove the old cap, take out the three #10-24 x 1/2" flat head screws (39) and lift out the old cap. Place new cap in place and screw it down tight with the three screws (39).



D. Place the gear case and motor housing (1) on the pedestal. Line up the holes for the hinge pin (44) and drive it in so that an equal amount of the pin extends on each side of the pedestal.



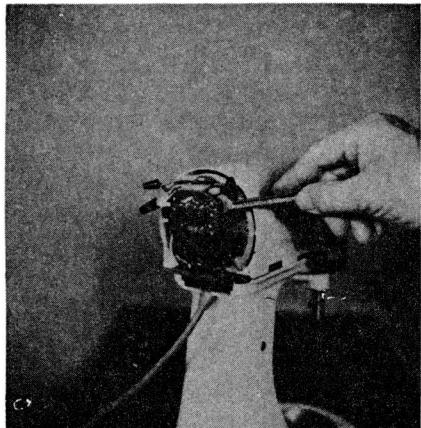
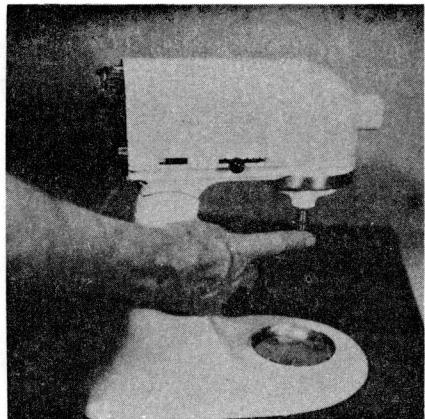
E. Turn the mixer upside down on padding for it to rest on. With a screwdriver, reach up inside pedestal and tighten the cup point set screw (51).

SECTION 6 ADJUSTMENT OF CONTROL UNIT

A. After installing new parts in the control unit, the control plate (2, Fig. 2) must be adjusted so that all speeds will be the same as they were when the mixer was new.

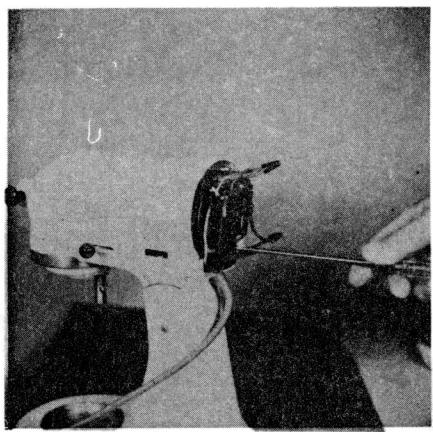
B. Make sure that all of the wire leads are properly connected and that they are locked together firmly with the wire connectors (10). Plug the cord into a receptacle having the proper voltage.

C. To adjust the speeds, move the switch lever (45) to first speed. This may or may not start the motor. If motor did not start, turn out the two adjusting screws (1) evenly and stop when planetary turns about 60 revolutions per minute. To test the speed, hold a finger of the right hand at the planetary. Let beater shaft (35, Fig. 1) hit finger. Count the number of times the finger is touched in 5 or 10 seconds. Adjust the two screws until the shaft touches the finger once every second or 60 revolutions per minute.



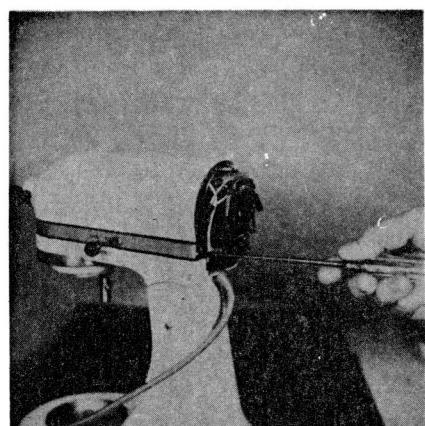
D. When proper speed has been set, lock the two lock nuts (4, Fig. 2) and check the speed again. If a small correction must be made, make it without loosening the lock nut. Test speeds as before and when correct, it will not be necessary to disturb the lock nuts (4).

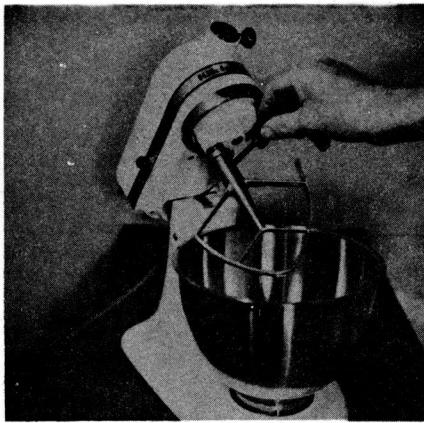
E. Move the switch lever to speed number 6. At this setting, the planetary must turn 180 revolutions per minute. Check the speed as was done for 1st speed. The planetary should touch your finger 15 times in 5 seconds. If it touches the finger less than that, turn in the adjusting screw at bottom of the control plate. Check the revolutions again and keep adjusting the screw at the bottom until the right speed is reached. There is no need for locking this screw.



F. Try all speeds from #1 to #10. If #1 and #6 speeds are properly adjusted, the other speeds should automatically be correct. If there is a definite change in speed between #8 and #10 the control unit is correctly adjusted.

G. Place trim band (5, Fig. 1) on the gear case and motor housing and with the two #6-32 x 3/16" binding head screws (63), fasten it to the end of the housing. Tuck in all the wire leads and place the end cover on end of machine and secure it with the #6-32 x 3/8" oval head screw (65).





H. With the end cover (64) on the machine, test the speeds again to be sure no change took place in the control plate. With mixer working perfectly, place bowl (38) on the bowl screw cap (40). Place flat beater (32) on the agitator shaft (35). Lower the head so beater is at bottom of bowl. There should be approximately $1/16$ " clearance between bowl and beater. If beater is too close to bowl, turn in the adjusting screw (50) and out if it is too far away. Mixer is now ready for operation.

SECTION 7 REPAIRS TO MODEL K5-A BOWL LIFT ASSEMBLY

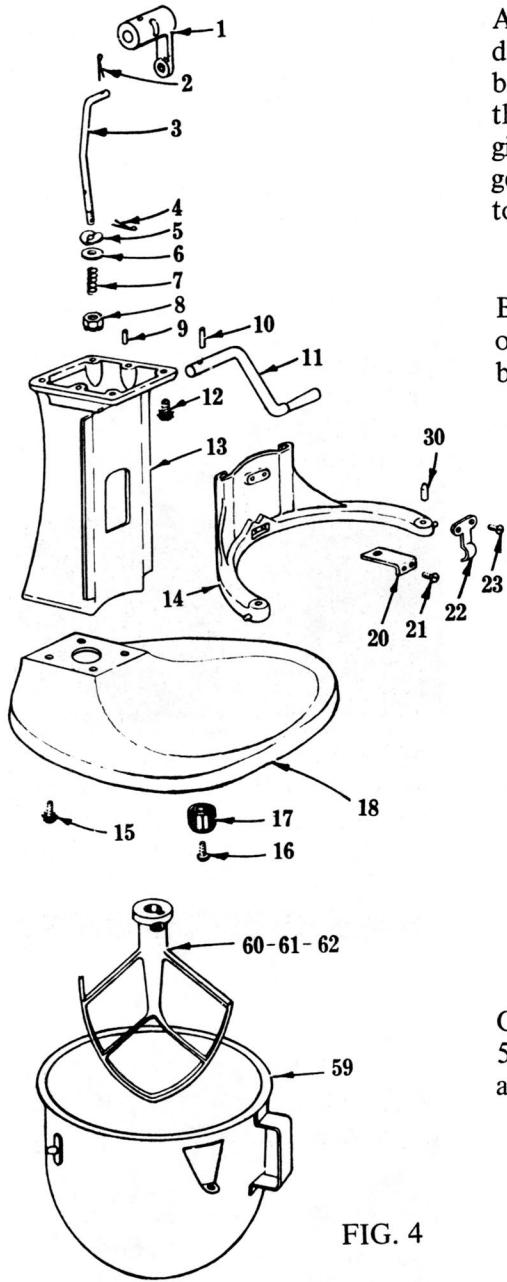
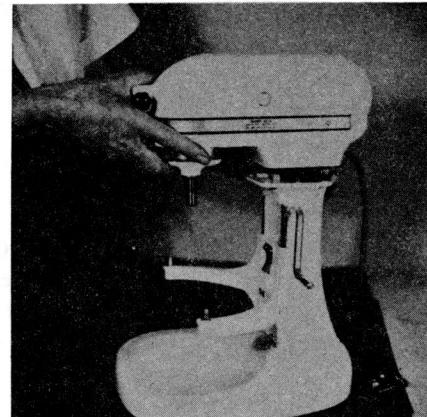


FIG. 4

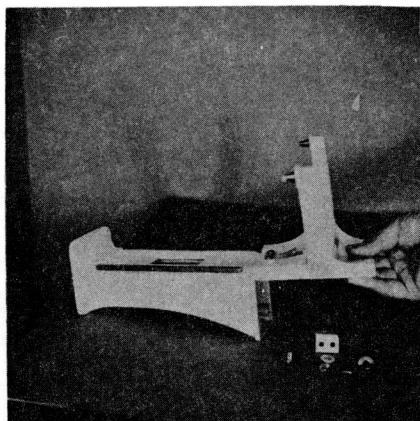
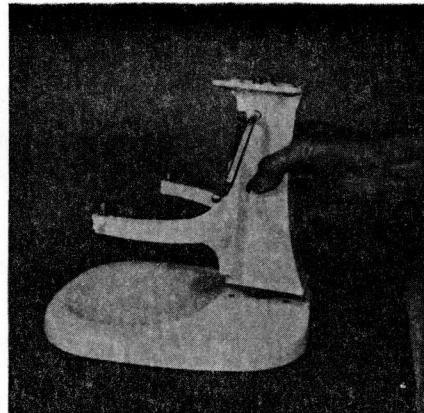
A. The Models K45 and K5-A KitchenAid mixers have different types of bowls and are different in size. The K45 bowl is held stationary by mechanical means at bottom of the pedestal, whereas the K5-A bowl slides up and down on gibbs on the front of the pedestal. On the Model K5-A, the gear case and motor housing is stationary making it necessary to move the bowl.

B. Should the mixer be tipped over or knocked off the table or counter and the bowl support assembly (14, Fig. 4) will be broken. To repair, it is necessary to replace the bowl support.



C. To replace the bowl support (14), remove the four $5/16$ "-18 x $3/4$ " round head screws (12) and lift the gear case and motor housing off the column (13).

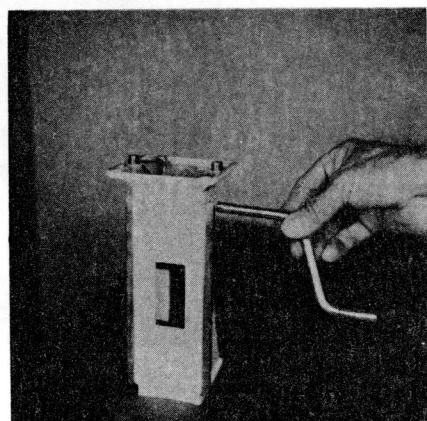
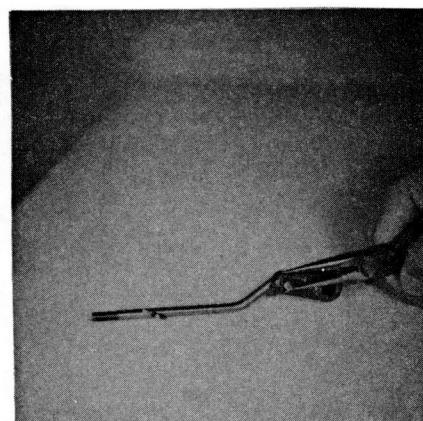
D. With the bowl lift assembly on the bench, lay it on its back and remove the four 5/16"-18 x 3/4" round head screws and lock washer assemblies (15) and lift the column (13) off the base (18).



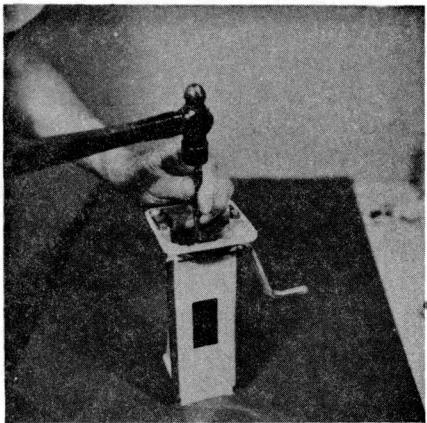
E. With a 7/16" socket wrench on a short extension, remove the 1/4"-28 castle nut (8) and take out the spring (7), the washer (6) and the "V" washer (5). Take out cotter pin (2) and remove the bowl lift arm (3). Unscrew and remove the two #10-24 x 1/2" flat head screws (21) and pull out the bowl lift bracket (20). With the bracket out, slide the bowl support (14) down and off the column (13).

NOTE: On late model K5-A mixers, the 1/4"-28 castle nut (8, Fig. 4) and cotter pin (4) have been replaced with a 1/4"-28 Elastic nut. This nut holds tight without the use of a cotter pin.

F. Examine the bowl lift arm (1, Fig. 4). This part is made of iron and is held on the bowl lift handle with a tapered pin (10). If the arm is cracked at the pin hole, replace it. If there is any fault in the column (13) replace it at the same time.

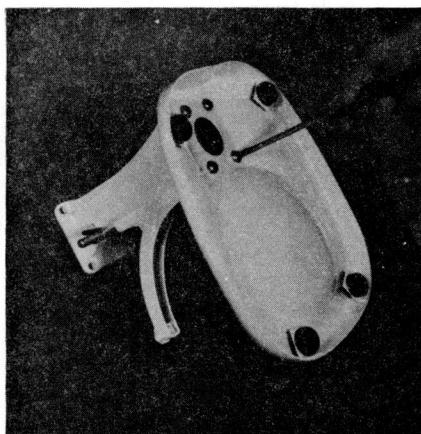
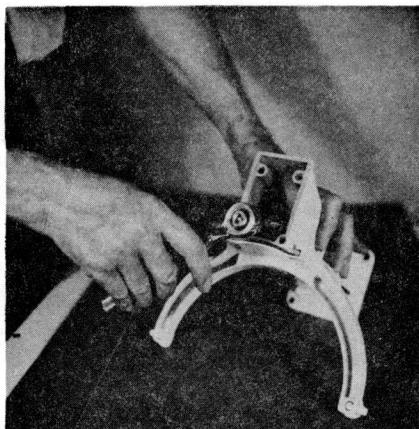


H. Place the bowl lift rod (3) in the hole in the arm (1) so that the rod will rest in the rounded part of the arm. Place the cotter key in the rod and spread the key to hold it in the rod.



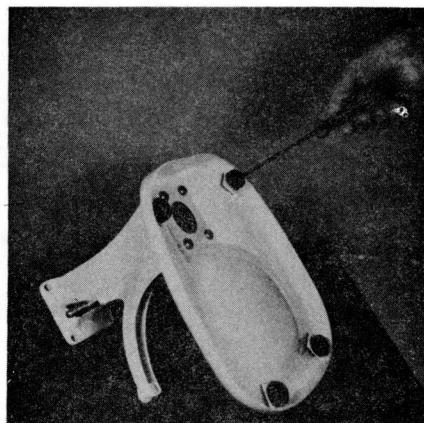
I. Hold the bowl lift arm (1) with large end of tapered hole up. Start bowl lift handle into the arm. Hold handle so it is pointing down. Push it all the way through the arm and into the bearing hole in the column. Place small end of tapered pin (10) in the arm and drive it through the lift handle. Be sure the pin is very tight.

J. Slide the new bowl support assembly (14) on the column (13). Place the bowl lift bracket (20) in place through the support and screw in the two #10-24 x 1/2" flat head screws (21). These screws must be very tight. Hold the support and guide the lift rod (3) into the hole in the bracket (20). With rod extended through the bracket, place the "V" washer (5) on the rod with the point of the "V" down toward base of machine. Then place washer (6) on the "V" washer, the spring (7) and the castle nut (8). Turn the castle nut down so that the tension will be great enough to snap the rod (3) into the arm (1) and hold it there.

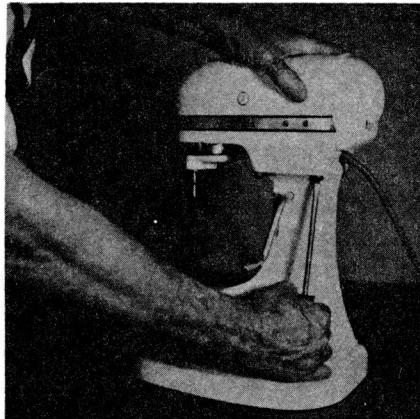
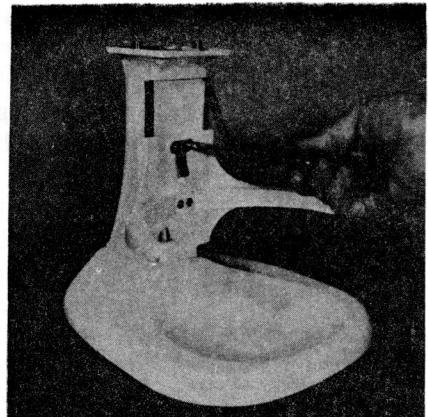


K. Place the base (18) on the bottom of the column (13) and screw in the four 5/16"-18 x 3/4" round head screws and lock washers (15). Be sure these screws are very tight to prevent shaking loose.

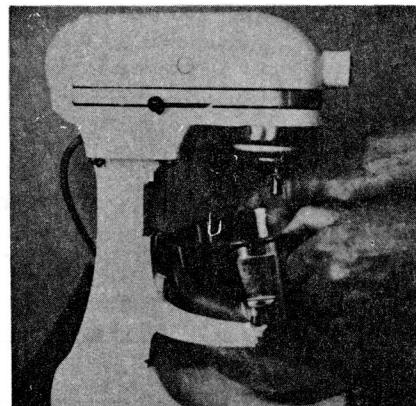
L. If the base feet (17) are worn, replace them. To replace the feet, unscrew the #8-32 x 1/2" round head screws (16) and remove the old feet. Place the screws in the new feet and screw the feet to the base. Do not tighten so much as to push screw through the rubber.



M. The bowl spring latch (22) must be installed to complete the repairs to the bowl support (14). The function of this latch is to hold down the rear of the bowl. Hold latch with bent spring and insert the two #10-24 x 1/4" round head screws into the column and turn the screws in tight.



N. Place the gear case and motor housing on the column (13) and screw in the four 5/16"-18 x 3/4" round head screws (12). These screws must be tight. Mixer is now ready for operation.



O. To mount the bowl (59) on the support (14), hold the bowl with bowl latch button to the rear. Push button under the bowl latch spring, then set ears of bowl down on the locating pins (30). Do not mount bowl on pins first and then snap button down on the latch. This will break the spring latch.

SECTION 8 SERVICE PROBLEMS

Troubleshooting the K5-A Bowl Lift Assembly

A. If the beater rubs the bottom of the bowl, it can be corrected by shimming up the motor housing. There should be 1/16" clearance between bottom of bowl and end of the beater. This can be done by using washers 1/16" thick or by making a shim to fit all around the top of the column. Be sure the four screws (12) are tight when housing is placed back on the column.

B. Too much clearance between bowl and beater. In this case remove any shims or gaskets that may be found under the motor and gear housing. This will allow the beater to move closer to the bottom. If too much shim was removed, add enough to give 1/16" clearance between bowl and beater.

C. If the bowl and beater are too far apart and there are no shims between motor housing and column, the bowl support assembly (14) must be adjusted. To do this, remove the motor housing and the base and disconnect the pull rod and remove the bowl lift bracket (20). With column on the bench, mark the column with a line across the top, down from the top approximately the same as the amount of excess space between beater and bottom of bowl. File out this amount from the top of the bowl support. Be sure to file straight so pressure will be the same all across the top of the bowl support. Reassemble the bowl support and try the beater and bowl. If still too much space exists, file away a little more, then reassemble.

D. Bowl rocks on the bowl support. This is caused by a broken bowl spring latch (22). Remove the two screws (23) and place a new latch in position. Screw in the two screws (23) tightly.

E. If bowl retaining pins (30) are worn, the bowl will move on the pins and beater will hit sides of the bowl. To replace the pins (30), twist and pull at the same time. They are not difficult to remove. To place new pins in the bowl support, place pins in the holes, support the end of the arms with a heavy object and drive the pins down gently. Be very careful not to bend the arms of the bowl support.

The following table lists the more common troubles in the repair of models K-45 and K5-A KitchenAid mixers. The trouble and possible cause are given with the method used for remedy. For more detailed instructions on how to correct a fault, refer to index for the instructions in other parts of this manual.

Trouble	Possible Cause	Remedy
SWITCH LEVER CLICKS BUT MIXER WILL NOT RUN OR BUZZ	Open electrical circuit.	Progressively disassemble the speed control mechanism and motor and perform the following checks until the open circuit is found: Faulty plug. Faulty attachment cord. Bad connection in speed control mechanism. Faulty speed control plate. Bad connection to toggle switch. Wire lead loose from brushholder. Bad connection between field and cord. Open-circuited armature. Open-circuited field. Faulty Switch.
MIXER WILL NOT SHUT OFF WITH SWITCH LEVER	Toggle switch not correctly adjusted with switch control link.	Separate the housing from bottom cover and turn the switch hex nuts until toggle switch arm properly engages point on switch control link.
BOWL NOT HELD FIRMLY ON BASE OF MIXER	Loose clamp disc screws. Bent screw cap.	Tighten the screws. Replace screw cap. If none available, bend the four lugs or lips back into position.

Trouble	Possible Cause	Remedy
BEATER STRIKES BOWL OR TOO MUCH CLEARANCE	Adjusting screw at rear of pedestal not properly set.	Turn the adjusting screw slightly to right or left to adjust clearance. Clearance should be 1/16 inch.
	Steel plate on tongue of gear case and motor frame loose.	Drive out the hinge pin attaching the gear case and motor frame to the pedestal. Separate them. Check the rivets holding the steel plate. If loose, support the flat heads of the rivets on a steel block and peen the other ends.
PLANETARY TURNS BUT BEATER DOES NOT REVOLVE	Pinion gear drive pin broken.	Remove planetary and take off the pinion gear. Replace the drive pin.
MIXER RUNS WITH RASPY, BUMPY NOISE AT PLANETARY	Gear case cover internal gear teeth worn or broken.	Remove the planetary and gear case cover. The complete gear case cover assembly must be replaced.
MIXER RUNS WITH BAD VIBRATION AND RUMBLING NOISE	Faulty governor.	Replace governor.
MIXER RUNS ON LOW SPEED BUT HAS NO POWER	Dirty contacts.	Clean the contacts as shown in Figure 5.
	Bad electrical connections.	Check the connections to the control plate. Repair any loose connections.
	If the mixer still has no power after cleaning the contacts and checking the connections, the contacts are faulty.	Replace the control plate assembly.
MIXER HAS NO POWER ON LOW SPEED BUT OK ON HIGH	Low speed adjustment improperly set.	Remove end cover and plug in cord. The planetary should revolve at about 60 RPM at the No. 1 position. To adjust, turn in the control plate adjusting screws an equal amount.
	Faulty governor.	Turn the switch knob to No. 10 position and hold out the control plate as far as possible. Turn the knob to OFF and observe the governor as it recedes when the armature slows down. The outer plate must move in smoothly, without sticking, until almost touching middle plate. If governor is faulty, replace with new one.
MIXER RUNS ONLY ON HIGH SPEED	Control plate spring unhooked.	Remove trim and end cover and check control plate spring. If unhooked, attach to top of the control plate and squeeze the spring end.
	Welded contacts.	Observe operations of control plate contacts when switch knob is turned from high to low speed. If contacts don't separate, contacts are welded. Replace the control plate assembly.
	Short-circuited condenser.	Disconnect one yellow condenser lead and turn switch knob to No. 1 position. If mixer jumps to high speed when loose lead is touched to other leads, the condenser is shorted and should be replaced.

Trouble	Possible Cause	Remedy
MIXER RUNS WITH JERKY CLATTERING NOISE ON LOW SPEED	Loose connection from center top of resistor to control plate (two black leads).	Check this connection to make certain it is not loose.
	Tight bearing.	First check the bearing in the planetary beater shaft. If the bearing can be easily moved with a back-and-forth twisting effort, it is satisfactory. If it binds, remove the planetary and recheck the mixer. If the mixer still uses excessive watts, it must be disassembled and the other bearings checked.
LOUD RUMBLING NOISE	Ball in end of armature shaft worn or flat.	Disassemble the motor and replace the ball.
	Worn thrust ball bearing.	Remove the gears from the gear case and the armature from the motor housing, then replace the thrust ball bearing.
MIXER RUNS BUT WILL NOT COME UP TO HIGH SPEED. HAS POWER BUT LABORS AND USES EXCESSIVE WATTS	Tight bearing if no smoke is apparent.	First check the bearing in the planetary beater shaft. If the bearing can be easily moved with a back-and-forth twisting effort, it is satisfactory. If it binds, remove the planetary and recheck the mixer. If the mixer still uses excessive watts, it must be disassembled and the other bearings checked.
	Burned out armature if mixer smokes.	Disassemble the motor and replace the armature assembly.
MIXER WILL NOT SHUT OFF WITH SWITCH KNOB	Toggle switch not correctly adjusted with control link and cam assembly.	Remove trim and turn the switch hex nuts until toggle switch arm properly engages point on control cam.
SWITCH KNOB CLICKS BUT MIXER WILL NOT RUN OR BUZZ	Open electrical circuit.	Progressively disassemble the speed control mechanism and motor and perform the following checks until the open circuit is found: Faulty plug. Faulty attachment cord. Bad connection in speed control mechanism. Faulty speed control plate. Bad connection to toggle switch. Wire lead clip detached from brush holder. Bad connection between field and cord. Open-circuited armature. Open-circuited field.
ELECTRICAL SHOCK TO OPERATOR	Bare lead touching inside of housing.	Pull the plug, turn the switch on and check for a ground with a test lamp. Touch one prong of the test lamp to a prong of the plug and the other prong to an unpainted spot on the housing. If the lamp lights the mixer is grounded. Examine all the wiring in the order of its accessibility until the grounded lead is found. If mixer has radio interference condenser wired between stator screw and power cord, remove and discard.
MIXER WILL NOT RUN ALTHOUGH SWITCH CLICKS AND MOTOR BUZZES	Frozen bearing.	Examine all the bearings in the order of their accessibility until the frozen bearing is found.

Trouble	Possible Cause	Remedy
BAD SPARKING AT CONTACT POINTS OR BURNED CONTACTS	Open-circuited condenser.	Disconnect one yellow condenser lead and turn switch knob to the No. 1 position. If a very faint spark can be seen when the lead is touched to the other three leads when the connection is made or broken, the condenser is not open. If the condenser is in good condition, a noticeable decrease in sparking is apparent at the contact points. Replace a faulty condenser.
	Faulty resistor.	Turn the switch knob to high speed and break the circuit through the contacts by lifting the inverted "T" shaped part of the spring on which the contacts are mounted. If the mixer comes to a full stop, the resistor is faulty and should be replaced.
BAD SPARKING AT MOTOR BRUSHES	Worn motor brushes.	Remove brushes and check that they are not worn to less than 5/16 inch. Replace with new brushes if excessively worn. (Grade F-6)
	Rough commutator.	Remove the trim strip and hold a narrow piece of fine sandpaper against the commutator as the motor is running. If the commutator cannot be smoothed down in this manner, remove the armature and turn it down in a lathe.
	Faulty armature or shorted motor field.	Disassemble and check motor.